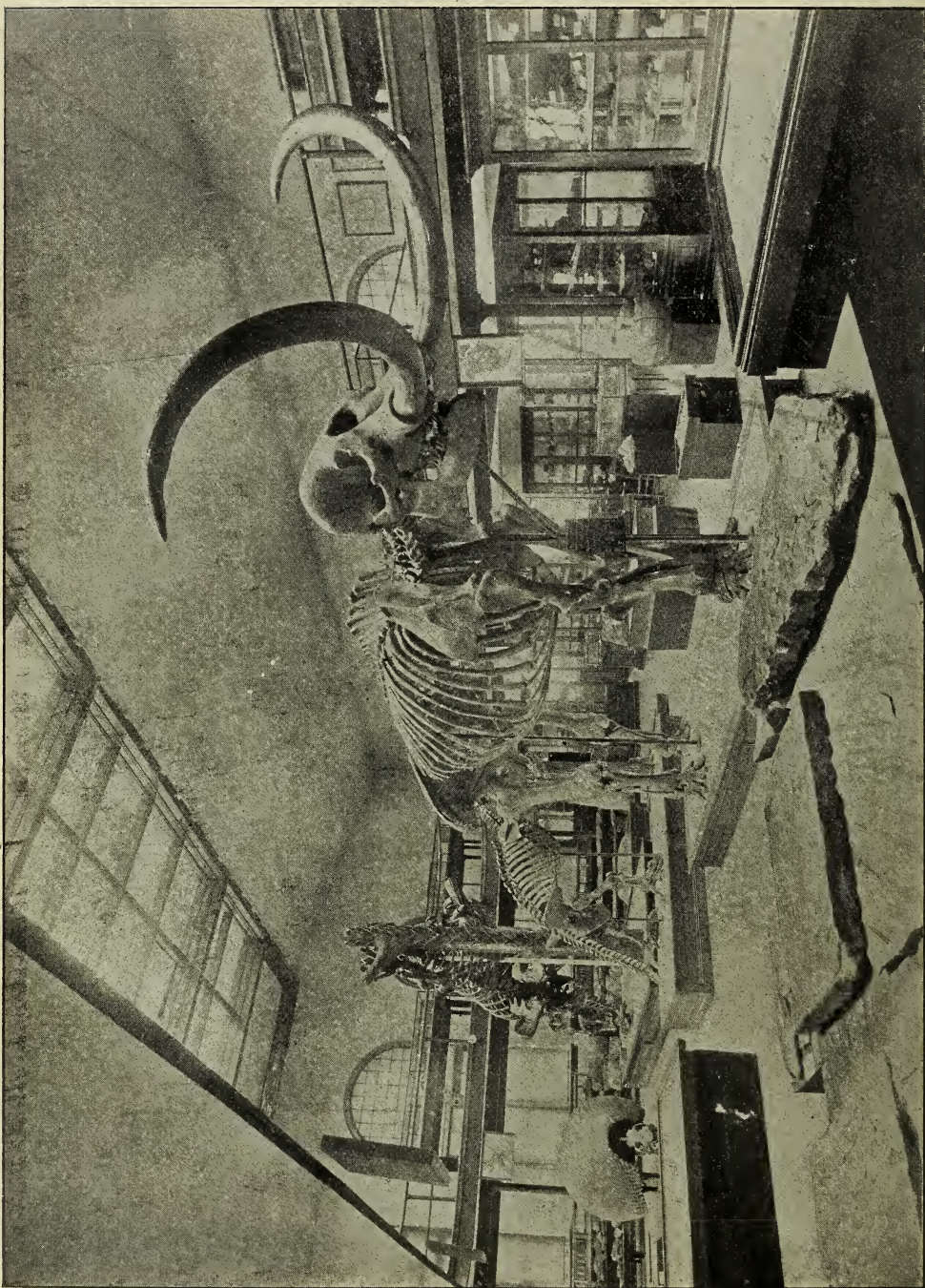


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GEOLOGICAL MUSEUM, ORTON HALL.

THE AGRICULTURAL STUDENT.

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EDITORIAL CHAT.

In compliance with the demands of various teachers' organizations of the state, and the recommendations of Gov. Bushnell to the Ohio Legislature, a bill has been introduced in the house providing for the establishment of State Normal Schools. In this line of educational work Ohio has fallen behind her sister states. Many of the other states have the Normal School system, and it will prove the part of wisdom to inaugurate the system under state auspices in Ohio.

The bill introduced by Mr. Leese provides for four schools in the state, each costing about \$25,000 annually. There seems to be a growing sentiment in favor of establishing one of these schools at the University, or better still, to make only one school and that to be connected with the University. If this system is to be paid for and controlled by the state, it surely would be the part of wisdom and economy to have such a school located at the University, where all the advantages of the previous work of the state in higher education could be obtained at a fraction of the cost required to establish such a school or schools independent of it. Another argument in favor of a Normal College at the University is the fact that Dr. Gordy would perhaps be available as the dean of that school. Along this line Dr. Gordy has

a national reputation, and the fact that a man so widely and so favorably known was at the head of the school, would do much to insure success from the beginning.

While it is evident that the establishment of such a system would be productive of much good and should receive the hearty support of the present Legislature, the educational institutions already in existence should not be overlooked.

The first duty of the Assembly is to properly support the Institution which has become so prominent in the state, and stands more directly for it in educational matters than any other. The founders of the University builded wisely and its growth has been phenomenal.

While liberal appropriations for buildings and equipment have been made in the past, they are entirely inadequate to properly accommodate the increasing number of students at the present. We earnestly hope that first of all we may see the most crying needs of the University amply provided for by the present Assembly.

President Thompson appeared before the Finance Committee of the Senate and House January 18th, and laid before them clearly and forcibly the most urgent needs of the University. The growth of the University makes many improvements very desirable in order to

keep abreast of the demands made upon it, but the authorities seem to have adopted the wise policy of concentrating all their energies in securing first the things that are most sorely needed. These are four new buildings—a law building, physical laboratory, library and woman's building, with special requests for the first two immediately.

There is perhaps no department in the University so homeless as the law department. From the beginning it has been hampered by lack of suitable quarters. Crowded out of Orton Hall, by the department for which that building was built, it has been moved to the Main Building, where the conditions are very little better.

From time to time the attention of the Trustees and Legislature have been called to the urgent need of a law building by the various organizations of the students in that department, and we trust that the 400 students in the department will soon have a building devoted entirely to the interests of their College. The needs of the physical department are hardly less urgent. It goes without saying that thorough work cannot be done with delicate apparatus requiring the most favorable conditions for successful research in that line, under conditions extremely unfavorable. Indeed, it is hard to see how either of the four buildings can long be dispensed with, if the growth of the University continues, and it is sure to do so. We earnestly hope that the coming summer will see these four buildings under way of construction.

We wish to again call the attention of our readers to the meeting of the State Dairymen's Association, which was announced in the January number of the STUDENT. A very good program has been arranged, including two addresses by Major H. E. Alvord, of the Dairy Di-

vision at Washington, D. C., and two addresses by Director Chas. S. Plumb, of the Indiana Experiment Station.

Over two hundred dollars in money and one hundred dollars in other premiums have been offered on butter and cheese. Programs and premium lists may be obtained by addressing L. P. Bailey, Tacoma, Ohio.

An automobile plow has been invented by Dr. R. J. Gatling. The machine can be operated by a single man and it is claimed that it will do the work of eight men and twelve horses. The machine can also be used as a motor for other implements. The twentieth century will doubtless be known as the century of automobiles.

In the September number of the STUDENT there appeared an article on "Method of Preparing, Use and Result of Starter," signed by Oscar Erf. Mr. Erf desires us to say that the last part of the paper only should be credited to him.

We printed the article as handed to us and there was evidently a mixing of the copy of two similar papers. The mistake was unintentional on our part, and we trust this statement will be a satisfactory explanation to Mr. Erf and to the real author of the greater part of the paper, whoever it may be. We shall always endeavor to give everyone his just dues.

The article headed "Corn and Its Productions" in the January STUDENT should have read "Corn and Its Products."

By special invitation Homer C. Price, Assistant in Horticulture, will deliver an address on "Leaks on the Farm" before the Farmers' Institute of Tippecanoe County, Indiana, the afternoon of January 30th.

Annual Meeting of the Agricultural Student Union.

The annual meeting of the Student Union of Ohio was held January 10th in the Hall of Townshend Literary Society. In point of attendance and interest it was the best meeting the Union has ever held. Many of the institute workers and prominent agriculturists of the state were present and expressed their interest in the work that is being done by the Union.

Professor Gibbs, as President of the Union, called the meeting to order and briefly spoke of the work that is being done. In the absence of the Secretary, Mr. Cunningham, H. C. Price was chosen as Secretary for the evening. The report of the Treasurer showed a balance of \$228.04 on hand.

Professor Selby, as Experimentalist of the Union, reported the work that had been done in the different departments. Owing to the adverse season and the late date at which the work was begun, the results were not as satisfactory as anticipated. On the whole, however, the work has progressed, and the prospects for the coming season are bright.

The program of the evening consisted of an address by Chas. E. Thorne, Director of the Ohio Experiment Station, on "Experimental Work," and an address by Dr. W. I. Chamberlain on "The Making of Our Soils."

The election of officers resulted as follows:

Frank Ruhlen, President.

R. W. Dunlap, Vice President.

H. C. Price, Secretary and Treasurer.

A. D. Selby, Experimentalist.

At a meeting of the Executive Board the following section chiefs were elected:

Agriculture, L. M. Bloomfield, Marlboro, Ohio.

Horticulture, F. K. Luke, Columbus, Ohio.

Dairying, J. W. Decker, Columbus, Ohio.

Forestry, E. J. Riggs, Raccoon Island, Ohio.

Soils, W. D. Gibbs, Columbus, Ohio.

Economic Botany, A. D. Selby, Wooster, Ohio.

Apiculture, John F. Cunningham, Cleveland, Ohio.

Anyone anticipating taking up any work in the Union should correspond with Professor Selby or the section chief of the line of work they desire to do. The material and directions for carrying on the work are furnished free on condition that the results are reported at the end of the season.

Agricultural Reading Room.

The reading room in Townshend Hall, furnished with a large list of the leading agricultural papers, plays an important part in the life of every agricultural student. Almost any hour in the day students may be found here gleaning the current agricultural news, and it is safe to say that almost every student in the department spends some time here each week. The student here has a chance to examine and compare the merits of the various papers and magazines devoted to the subject, and it goes without saying that in after life the papers he here decides to be the best will be the ones found upon his table.

A very large number of papers are received from the publishers gratis and in exchange for the AGRICULTURAL STUDENT. There are yet some good agricultural papers that are not on the shelves, but we hope to soon see them there. The following is the list of copies regularly received:

American Agriculturist, New, York, N. Y.

American Cultivator, Boston, Mass.

American Fancier, Johnstown, N. Y.

American Grange Bulletin and Scientific Farmer, Cincinnati, O.

American Poultry Journal, 325 Dearborn Street, Chicago.

American Sheep Breeder, Chicago, Ill.

American Stock Farm, Lexington, Ky.

California Cultivator, 113 S. Broadway, Los Angeles.

Colman's Rural World, St. Louis, Mo.

Creamery Gazette, Des Moines, Iowa.

Dairy World, Chicago, Ill.

Dairy and Creamery, 315 Dearborn St. Chicago.

Dakota Farmer, Aberdeen, South Dakota.

Elgin Dairy Report, Elgin, Ill.

Farm Journal, Philadelphia, Pa.

Farm, Stock and Home, Minneapolis, Minn.

Farm Home, Springfield, Ill.

Farm Implement News, Masonic Temple, Chicago.

Farm and Home, Chicago, Ill.

Farm Students' Review, St. Anthony Park, Minn.

Farm, Field and Fireside, Chicago, Ill.

Farming, Confederation Life Building, Toronto.

Farmer and Breeder for the Farm Home, Springfield, Ill.

Farmer's Home, Dayton, O.

Florists' Exchange, New York, N. Y.

Gleanings, Medina, O.

Hoard's Dairyman, Fort Atkinson, Wis.

Horse Review, Chicago, Ill.

Horse Show Monthly, Kansas City, St. Louis.

Implement News, Philadelphia, Pa.

Indiana Farmer, Indianapolis, Ind.

Iowa Homestead, Des Moines, Iowa.

Irrigation Age, 916 W. Harrison St., Chicago, Ill.

Kansas Farmer, Topeka, Kan.

Mark Lane Express, London, Eng.

Michigan Farmer, Detroit, Mich.

National Stockman and Farmer, Pittsburgh, Pa.

Nebraska Farmer, Omaha, Neb.

New England Farmer, Boston, Mass.

New York Produce Review and American Creamery, New York, N. Y.

Northwestern Agriculturist, Minneapolis, Minn.

Ohio Farmer, Cleveland, O.

Our Dumb Animals, Boston, Mass.

Practical Farmer, Philadelphia, Pa.

Prairie Farmer, Chicago, Ill.

Rural New Yorker, New York, N. Y.

Swine Breeders' Journal, Indianapolis, Ind.

Wisconsin Farmer, Madison, Wis.

James Harvey Sanders.

James Harvey Sanders was born on a farm in Union County, Ohio, in 1832, from a Virginia ancestry. In 1852 he removed, with his parents, to Keokuk County, Iowa, accomplishing the long journey in the canvas-covered "prairie schooner." He began his career in the West as a school teacher. In a few years he returned to Ohio for his bride, purchased a farm, and by unremitting labor cleared it of debt and laid the foundation of his success. He was elected Secretary of Iowa State Senate, and subsequently clerk of the county in which he lived, and removed to the county seat and engaged in the banking business in which he was successful. He also became proprietor of the Sigourney News. In these public relations he influenced very materially the loyal sentiment of the State during the trying times of the civil war. He was offered a commission to raise a regiment, but declined on account of domestic reasons.

The Sanders farm at Segourney was stocked with the best specimens obtainable at that day, and a scientific study of heredity was among the earliest and most absorbing pursuits of its proprietor. Unable to find in the agricultural jour-

nalism of the day any definite treatment of the problems of breeding. Mr. Sanders established the *Western Stock Journal* in May, 1869, the first distinctively live stock journal published in the world. In September, 1870, the *National Live Stock Journal* was established in Chicago, and in November of that year the *Western Stock Journal* was consolidated with it, Mr. Sanders assuming the position of associate editor.

In the meantime he had become interested in a railroad in the West, but the financial crisis of the early seventies wiped out the little fortune which had been accumulated. He now accepted an offer to become managing editor of *The Spirit of the Times*, published in New York, and remained in this position one year. In company with Mr. S. G. Brabrook he then purchased the *National Live Stock Journal*. After about two years he sold his interest to his partner, but remained as editor until 1881.

In October, 1881, he established the *Breeders' Gazette* to meet the demand for a quicker and more frequent organ of information on this all-absorbing subject. Mr. Sanders being eminently fitted for the direction of such a journal, the venture was remarkably successful.

In 1888 Mr. Sanders was commissioned by Secretary Rusk for a special mission abroad. He was required by his instructions to sever his connection with the *Gazette* and never resumed active relationship with it, although always a wise adviser.

Mr. Sanders is the author of "Horse Breeding" and "Breeds of Live Stock," which are authority on the subjects treated, both in this country and in Europe. He also prepared the first volume of the "Breeders' Trotting Stud Book." He was a constant and forceful writer in the columns of the agricultural press.

Prior to 1888 Mr. Sanders was a member of the Treasury Cattle Commission

and devised the system of quarantine stations that have done so much in preventing importation of diseased live stock from abroad. He was chief promoter of the Chicago Agricultural and Live Stock Show held in 1881, and President of the association under whose auspices it was held.

He always earnestly advocated the establishment of pedigree registry associations in order that breeding might be conducted with intelligence and the types maintained in purity. To this and to his intelligent teaching on the subject we owe, in a great measure, the present degree of perfection in the live stock of this country. No one can measure the benefit to mankind. We are so prone to forget that everything we enjoy today cost years of patient toil and was obtained at the expense of human life. Mr. Sanders' work, however, will truly live after him, for so long as a single individual of the higher domesticated animals exists, mankind will reap the benefits of his life work.

The last years of Mr. Sanders' life was clouded by ill health and after the death of his wife in 1898 his decline was rapid. While in the South for rest and medical aid the end came on December 22, 1899. The farmers of the entire country, but especially live stock breeders, have lost a leading champion of their interests.

Forest Trees of Ohio.

Ohio is one of the richest States of the Union in number and variety of her native forest trees. By a careful count and inspection we find that there are 90 species of indigenous trees in our State. This, I believe, is a larger number than any other State can boast.

To comprehend the relative importance of our trees and shrubs, let us take a glance at the forests of Great Britain. Great Britain and Ireland contain about 121,000 square miles; Ohio contains

about 40,000, a little less than one-third as many. Great Britain has only one bass-wood, one small maple, one cherry from 10 to 20 feet high, one ash, two elms, two poplars, one large beech, one small white birch, one species of pine, and one oak which sometimes attains considerable size.

Great Britain has only about 12 species of trees native to her soil, while Ohio, with one-third the area, has seven and a half times as many. We have in Ohio nineteen oaks, six hickories, nine evergreens, four maples, five ash, three cherries, three elms, four willows, three birches, two catalpas, two locusts, two walnuts, two bass-woods and about 25 more separate species.

The whole 90 species are divided among 20 orders, seven of which have one species each, while Sapindaceæ, which contains the most, has 20. In all Europe there are only 85 species of native trees.

The question naturally arises, why has our country so many species and Europe so few? It is not due to a defective climate or soil in the latter, but because the past geological conditions of the two countries have been so different. Away back in the tertiary period the trees of the regions now having an arctic climate, were such as now grow in a warm temperate zone. Following this came the glacial epoch, when snow and ice for nearly all of the year extended to Ohio river. As cold approached, the trees slowly retreated southward. In this way the arctic plants reached extensive southern limits. As the climate again gradually grew warmer, the trees slowly emigrated northward. In this advance and retreat a great many of the migrating species naturally fell by the wayside and grew up with those native to that particular region. In this way there was a great dispersion of species.

In a similar manner the plants of Eu-

rope were driven southward, but the Mediterranean on the south being an impossible barrier, many of the temperate zone plants perished. Besides, the various mountain chains, running mostly east and west, had glaciers of their own which attacked the forests in the rear as they began to migrate northward again, and thus a great many of the northern species were lost. In the American continent there were no lateral glaciers, and the retreat was along an open way, and there were no impediments to the return, thus comparatively little destruction of species. So to our lot has fallen a goodly heritage of forest trees, which is of no little consequence.

We may ask, what are the uses of forest trees? The answer is plain and simple. In general, they purify the air, they furnish food, clothing, light, heat, building material and some very important medicines.

For posts we use the red cedar, locust, catalpa or chestnut; for cabinet-making, black walnut, black cherry, curly maple, butternut or oak; for farm implements, white ash, hickory, white oak, elm or bass-wood; for boxes and barrels, white pine and yellow poplar; for sugar, the maples; for nuts, chestnut, hickory, walnut and butternut; for wind-brakes, the hedges and evergreens. The judicious planting of trees gives a great security against washing and much attention is being paid to this in European mountainous countries. In cities and along railroads trees are planted as a very successful means of preventing the spread of fire.

Trees are also of great value for shade and ornament. Nothing adds more to the appearance of a home than a number of graceful and well-placed shade trees.

The forests of Ohio are being gradually cut down in order to secure more tillable ground and to get fuel.

Ohio was at one time entirely covered with forests, with a possible exception of a portion of the northwest section. Today only about 12 per cent. of the primitive forests are standing. This wholesale destruction of woodland cannot be without serious consequences. Statistics, I believe, show that our climate and rainfall are more variable now than in years past. The extremes of temperature between summer and winter are greater, and our rainfall, which, perhaps, has not changed appreciably in amount, is not so regular and uniformly distributed. Although we have no evidence that can be taken as conclusive, yet we have good reasons to believe that the cutting down of forests does affect both the climate and rainfall of that region.

It has been proven and demonstrated that if less than one-fourth the total areas of a country is wooded, that country fails to produce its normal aggregate of crops. According to this, the productiveness of Ohio land is on the decline, and the only practical way to insure the maintenance of the place which the "Old Buckeye" State now holds among the other States, is to replant and re-establish the native forest which nature had so graciously bestowed upon her.

F. W. T.

Sugar Beet Pulp for Sheep.

The establishment of sugar beet factories in different parts of the United States gives to those sections a new stock food—the sugar beet pulp, which is the residue of the beet after the sugar has been extracted by diffusion. It is often a puzzling question to the manufacturer how to dispose of his pulp. Scarcely any experiments have been made in this country in feeding it, and farmers are slow to begin using it, especially if they have to pay for it. Last fall I visited the sugar beet factory at Bing-

hamton, N. Y., after it had been in operation about six weeks, and the pulp had accumulated so that it was getting troublesome. They were giving it to the farmers for hauling it away, and those that were taking it were reporting very satisfactory results. I was at that time a graduate student at Cornell University, and in connection with C. H. Yates, a student of the same institution, an experiment was planned under the direction of Professor Roberts to determine the value of sugar beet pulp as a food for sheep. Forty ewes were purchased to be used in the experiment; they were of mixed breeding, but with the English mutton breeds predominating. They were not as good sheep as would be purchased for feeding as a rule, as they were past their prime, and some few of them had loose teeth; but they were the best we could find, and while the results were not as accurate as they would have been from a more uniform lot of sheep, yet the experiment as a whole gave results that, to our minds, were conclusive.

The forty sheep were divided into four lots as evenly as possible in regard to weight, age, health and general vigor. Each lot was fed on a different ration made up respectively of clover hay, corn silage, oat straw and sugar beet pulp, with enough grain in each case to make the nutritive ratio the same for each ration—the object being to compare the value of the four feeds as "coarse fodders" in a ration. In the lots fed on corn silage and beet pulp it was deemed best to feed a little hay to add dry matter to the ration. Each lot was divided into two pens of five sheep, and these pens were fed exactly alike, so that they served as a check on each other. The sheep were sheared early in November and put in pens that averaged 86 square feet for each five sheep. They were

kept in these pens from the middle of November until the first of April, being supplied with water and food. All the feed given to them was weighed and the sheep were weighed every week.

When the ewes were purchased it was stated that eight of the forty had been bred, and in dividing the sheep into pens one of the bred ewes was put into each pen, so as to make the conditions as near equal as possible; but later developments showed that more of them had been bred and nineteen lambs were weaned during the experiment. Two were dead when born and three died shortly after, the remaining fourteen were shipped to New York and sold as spring lambs before the experiment ended. In calculating the results it is obvious that account must be taken of the lambs, and they were weighed weekly and their weights kept separate. Although the lambs interfered with the experiment in determining the fattening values of the rations, because a ewe would not fatten while nursing a twenty-five or thirty pound lamb, yet they gave a chance for the observation of the coarse fodders tested in the ration of breeding ewes—a factor that is very difficult to determine except by observation. A preliminary period of three weeks was taken to gradually get the lots on the different rations, and the experiment proper lasted for fifteen weeks. For the first eight weeks of the experiment the nutritive ratio was 1:5.4 in each lot, and for the last seven weeks the ratio was narrowed to 1:4.5. Although the proportion of the different feeds varied some from week to week to suit conditions, the average for the entire period was about as follows, for ten sheep per day:

Lot 1—Clover hay, 20 lbs.; corn meal, 5 lbs.; wheat bran, 4 lbs.; oil meal, 3 lbs.

Lot 2—Corn silage, 50 lbs.; clover

hay, 10 lbs.; cotton-seed meal, 6 lbs.; wheat bran, 2 lbs.; corn meal, 6 lbs.

Lot 3—Oat straw, 20 lbs.; corn meal, 9 lbs.; linseed meal, 9 lbs.

Lot 4—Sugar beet pulp, 150 lbs.; clover hay, 8 lbs.; linseed meal, 6 lbs.; wheat bran, 4 lbs.

The ten sheep fed on sugar beet pulp ate the almost incredible amount of 15 lbs. a sheep per day, besides the liberal feed of grain which it was necessary to give the proper nutritive ratio. The pulp was eaten with avidity, and only when it became frozen before they could eat it all was any left to weigh back. Next to the pulp the corn silage was eaten best, and in order came clover hay and oat straw, as is shown by the following table, which gives the per cent. of the feeds weighed back for each ration during the fifteen weeks.

Lot 1, ration clover hay weighed back, 10 per cent. Lot 2, ration corn silage weighed back, 16.5 per cent. Lot 3, ration oat straw weighed back, 49.5 per cent. Lot 4, ration beet pulp weighed back, 1.2 per cent.

As shown by the table, Lot 3 fed on oat straw as their coarse fodder did not eat but a fraction over one-half, and, as might be expected, their gain was proportionately small, and the cost of their gain per pound was the greatest of any of the lots. The gain per lot for the fifteen weeks was as follows:

	Ration.	Grain.	Grain, Lambs included.
Lot 1	Clover hay.....	55.4 lbs.	252.9 lbs.
Lot 2	Corn silage	82.7 lbs.	272.7 lbs.
Lot 3	Oat straw.....	17.0 lbs.	102.0 lbs.
Lot 4	Sugar-beet pulp.	170.9 lbs.	252.9 lbs.

This makes the total net gain (lambs included) of Lots 1 and 4 the same, while the gain of Lot 2 is twenty pounds greater than either of them. But the lambs were unevenly distributed—Lots 1 and 2 each raising five lambs, while Lots 3 and 4 only raised two apiece. It is dif-

difficult to make a fair comparison of the values of the rations from these weights, for it is evident if the weights of the lambs were not taken into account it would be an unfair comparison for Lots 1 and 2. On the other hand, if they are counted it gives Lots 1 and 2 an undue advantage. Another comparison of the results of the experiment can be obtained from the cost per pound of gain for each ration. Clover hay is calculated at \$8, oat straw at \$5, corn silage at \$3, and sugar beet pulp at \$1 per ton, which are about the prices ruling at the time of the experiment. Hence the cost of gain per pound:

Clover hay, lambs included, 24 cents, lambs excluded, 8 cents; corn silage, lambs included, 11 cents, lambs excluded, 6 cents; oat straw, lambs included, 32 cents, lambs excluded, 14 cents; beet pulp, lambs included, 8 cents, lambs excluded, 6.5 cents.

This shows the corn silage and sugar beet pulp to be about of the same value in the ration when silage is \$3 per ton and beet pulp is \$2 per ton. It was noticeable that the sheep on corn silage and beet pulp were in the best order and of the two lots the ones fed beet pulp were the better and their wool seemed to make the best growth of any of the sheep fed.

Sugar beet pulp is a heavy wet feed to handle and must be stored and fed where it will not be exposed to hard freezing. It will not ferment when put in large piles, like corn silage does, and thus protect itself against frost. On account of the high per cent. of water in the pulp, which is usually about 90 per cent., stock fed on it require very little water, and sheep will get along without any. On the other hand, owing to the large amount of water which they are compelled to take with their ration, it is very hard to keep the stables in which they

are confined from getting filthy. We were obliged to give the lot fed on beet pulp twice the space allotted to any of the others, and then bed them much heavier. Although there were drawbacks to our experiments that would not permit our results to be counted as accurate, yet from carefully watching the experiment, and knowing all the conditions, we felt justified in drawing the following conclusions:

(1) Sugar beet pulp may be successfully fed to fatten sheep at the rate of 12 to 15 pounds a day per head. (2) Sugar beet pulp at \$1 per ton net is a cheaper food for fattening sheep than corn silage at \$3 or clover hay at \$8 per ton. (3) Sugar beet pulp cannot become a stock food of importance outside of a radius of a few miles from the sugar beet factory, until some means is invented for expressing the water out of it. (4) The best results can be obtained in fattening sheep on sugar beet pulp and corn silage when some hay is fed with them.--Homer C. Price, in *The Breeder's Gazette*.

Hydrophobia in the Horse.

On January 13th we were requested to visit the stable of the Columbus Gas Co. to examine a horse which was showing peculiar symptoms. The animal had been bitten about three weeks prior by a dog which was known to have been rabid, and we felt quite sure of finding our patient suffering from hydrophobia. On our arrival we found the horse confined in a shed at some distance from the barn, and behind some tall brick buildings in the vicinity. This shed was surrounded by about 50 men and boys who withdrew to a respectful distance when we opened the door. The animal was a fine gray gelding, eight years old, standing about 15.2 in height, probably weighting 1100 pounds and in splendid

condition. It was so dark in the shed that it was almost impossible to see the horse at all and as he appeared quite still and gentle we led him out into a covered yard near by. He appeared stiff and walked very much like a horse suffering from lockjaw. The pupils of the eye were tremendously dilated and the dilation did not contract when the bright light struck them. The eyes were much constricted, the white appearing almost red and giving the animal a very startled look. He showed no other marked symptoms at this visit, was not the least violent nor excitable and after examining him thoroughly we placed him in the shed and told the foreman we would call again in the afternoon. On our afternoon visit we found our patient much as in the morning, except that he was slightly more irritable, laying back his ears when we touched him, but not more than many ticklish horses do when being harnessed. We inquired of the foreman as to the history of the case and found as before stated that the horse had been bitten on the nose about three weeks previous by a huge mastiff just as he was being driven into the wagon shed at the end of the day's work. The dog sprang up and bit through the cartilaginous wing of the nostril and ran on. A nearby veterinarian was called who cauterized the wound within 15 minutes from the time the bite was inflicted. The horse had been worked until the night before our visit, when on returning from work he refused his feed. The next morning we were called and found the animal in the condition described. The stable foreman was much afraid of his becoming violent and offered to call the horse ambulance and send him out to the hospital. As we were anxious to watch the case, we accepted the offer and the animal was delivered that same evening. He seemed much weaker than in the morning and the next morning, the 14th,

was found down, unable to rise. We placed the swings under him and raised him to his feet. He seemed quite irritable, laying back his ears and snapping at everyone working about him while getting him up. He seemed quite weak, swaying about in the slings and leaning against the wall. The eyes had the same peculiar stare and he would often prick his ears forward and seem as if listening to some far-off sound. He became very weak by noon and hung helplessly in the slings, so we lowered him to the ground and removed it, also removing the muzzle which he had worn. He struggled constantly while down, pawing and striking with his fore feet and biting viciously at everything in his reach. Holding a stick toward his head he would bite it and attempt to shake it. He would frequently reach around toward his side and bite the skin, varying this by biting the knee. He either was too weak or did not have the inclination to wound himself severely, as he did not break the skin in either place. The throat was paralyzed and in consequence there was a copious flow of saliva from the mouth. He neither ate nor drank while with us, although food and water were frequently offered. His struggles gradually became weaker and during the night of the 14th he died, in less than three days from exhibition of the first symptoms. A careful post-mortem was made 10 hours after death and revealed nothing striking other than a marked enlargement of the spleen and a great dissolution of the blood, which looked like black carriage varnish. So far as we have been able to trace this is the fourth horse, all splendid animals, dying from rabies from the bite of the same dog and we have at present a fine mastiff bitten by this dog confined in the hospital awaiting developments. Up to present writing we have had in our clinic four cases of rabies in cattle, one in the

dog and one in the horse. The rabbits inoculated from the case reported in the November AGRICULTURAL STUDENT all died within three weeks of rabies. The dog inoculated at the same time has shown no symptoms as yet, but was not inoculated in the cranial cavity, as with the rabbits.

C. W. E.

What Can the Short-Horn Breeder Do for Himself to Make Ohio a Short-Horn Center.*

In the able addresses you have just heard you have been made to realize what the American Shorthorn Breeders' Association offers our State Fair, and what the State Fair can do for the Short-horn breeders. Now comes the question, "What Can the Shorthorn Breeder Do for Himself?"

It is understood in this nineteenth century that a man to be a successful breeder of shorthorn cattle must be a man of brains. He must be a man of judgment or he will fail as some of us have done. He must have a good eye; an eye not only for beauty, but for the forms and characteristics that are attracting the buyers of today; an eye that takes in the animal and not always the pedigree; he must be a student. The old adage, "Never too old to learn," is being more forcibly impressed on our minds today than ever before. We are having changes made continually in our plans to meet the demands of the public. For years we could not sell lambs for mutton, but now we are using hot houses to get them ready for market as young as possible. A few years ago beef was not considered good unless it had age; now we hear much about baby beef. Our successful breeder must have the sense of touch highly developed, for in this lies very many important points. But one of his most important possessions

is energy—without energy his knowledge will not do him or others any good. Lastly he should follow his profession for the good he can do for the breed and not alone for the money that is in it. I know you will say we are all after the all mightly dollar, but there is a better reward than money.

So much for the breeder himself! Now, what can such a breeder do for his cattle so as to attract breeders to Ohio as a shorthorn center?

It does not make any difference how much money the State Board votes to our State Fair, or how much the National Association offers—we cannot attract breeders to Ohio as a shorthorn center unless the breeders put up a good show at our fairs. Why were the blue grass fields of Kentucky once the undisputed shorthorn center of America? Was it because of its blue grass pastures? No! It was because of the careful and keen judgment used by the breeders in selecting and breeding, so as to produce certain forms and characteristics which were in demand. The tide has drifted to other states. Once our own state was in the lead, but it has given way to other leaders. How are we to regain the honor that is lost and to bring Ohio back to her former place in Shorthorn history. There seems to me two things that must be done.

First. Breed the best to be had, whether red, white or roan, and make them so superior to all others that men cannot afford to pass us by when they are looking for superior animals.

Second. Let people know that you have them. It is much easier to say breed the best than it is to accomplish it. I am unable to say how the best may be bred by every breeder of our state, for there are as many different difficulties to overcome as there are breeders.

I will try to give you some general points, and if I am wrong will some of

* Read at the annual meeting of the Shorthorn Breeders' Association.

the older breeders please correct me?

First. I want to impress upon your mind the adage that, "Like begets like." Not that it is true in all cases, but it is generally the rule. When you go home take a good look over your cattle and see how many cases you have of it. So keeping this in mind we start in the short-horn business, expecting that every calf from the new bull that heads our herd will be like him. But we must remember that this head of our herd had ancestors, and that some of their qualities may come out in his offspring. Then there is the other side, that of the dam; she, too, will have some influence on the characteristics of the offspring. The calf is not often wholly unlike its sire and dam, but has the general characters of both.

With these facts in mind we should select a bull that is as near perfection as can be found; and not only should the bull be selected with care, but the females with even greater care.

The great fault found in the herds of this state is in the females; they are generally not as near the standard as are the bulls. Many of our breeders try to keep too many females and often have a number that should be put on the block. It will not pay to keep them as quality of the herd is always hard enough to keep up without having these inferior ones on hand to help drag it down. When you go home from this meeting look over your herd and see if there are not some inferiors that should be put on the block. Do not sell them to some inexperienced breeder to breed, for that will not improve our cattle and make Ohio a Shorthorn center. When you are buying a bull to head your herd or adding a female to it, do not buy the inferior ones because it is cheap, but buy the best, as it always pay in the end.

Try to keep your cattle even; that is, have some definite form in mind when buying and breeding. I like to go into

a herd where there is similarity, whether it is of the right kind or not. The herd makes a much better appearance. No doubt some of you remember what Mr. Barber said in regard to attracting breeders to this state to buy cattle. It seemed very plain to him that the only way was to keep fewer and better cattle than anyone else and then to let people know it. Then, after we have the stock, the next thing is to let the breeders of this country know that we have them and that they are among the best that is to be found.

There are two ways in which to accomplish this.

First. Advertisements in the stock papers. Second. Exhibition. I prefer the latter and think I can show you why. Newspaper advertisement does very well when you have articles like machinery, patent medicine, or nuresry stock to sell; something that can be described to perfection, but who can describe the animals of the herd, so that the reader may feel that wonderful something which passes through his finger tips to his brain, and puts a smile of satisfaction on his face when he has once laid his hand upon the coat of an animal? Can a breeder who advertises in the papers describe the form and markings of an animal so that the reader would recognize the animal if he were to see it? Some may be able to do it, but I have often been disappointed upon seeing an animal that was thus described.

In my mind there is only one way to get our animals before the public in a satisfactory manner and that is by exhibiting them at our many fairs. Would Mary Abbottsburn 7th ever been queen of American shorthorn cows if she had been kept at Forest Grove and Ivon Farm, and not been exhibited to the public? Could this wonderful cow have been advertised in a stock paper so that she would have been appreciated? I say

never! For men would have doubted that she was so near perfection. She had to be seen before one could realize her worth. What did the great show at Kansas City do for the Herfords? Did it not make the West a great center for Herfords? Of course, exhibiting cattle at fairs costs something, but if we are to make Ohio a Shorthorn center we must spend some money.

When we go to our State Fair do we not expect to see the best specimens that this or that herd can afford? We are not often disappointed, for the breeder knows that this is the best place to advertise his stock. It does not make any difference how much or how little money is offered at the State Fair; if I had cattle to sell you would find me there with them. For at the State Fair congregate not only the local buyers, but men from other states who are looking for the best.

Gentlemen, the State Board has done much for us in the way of buildings and premiums, and now they have a right to expect much from us. So let each breeder make it his aim to give to next year's fair circuit some of his time and some of his best animals. We may not be able to make ours the banner state in one year, but much may be accomplished toward that end. If you do not have the time or the animals to put out on the fair circuit, lend us a few hours toward making the Shorthorn Breeders' Association a grand success, not only in membership, but in helping one another to know how to improve and how to make known our breed.

E. DARLING.

A Trip Through the West.

We left northern Ohio about July 20. The first thing attracting our attention was the very deplorable condition of some of the farms in northern Indiana. In some instances whole fields had been ploughed and left without seeding, weeds

and water having taken possession. Corn fields were almost entirely hidden by weeds. Wheat and oat fields with shocks that looked more like piles of weeds than shocks of grain were seen on every hand. Fences were down; barns and other buildings dillapidated, and all because of the wet soggy nature of the soil which has never been drained.

But the scene was soon to change, and with it the nature of the soil and the character and intelligence of the people. The country through Illinois, Iowa and southern Minnesota, in appearance, was very much like Ohio. The topography of the land, the crops, and, in most cases, the buildings, were much like those in this state. As to buildings, however, some very noticeable differences exist, especially in Minnesota. The dwelling houses are generally small and the barns if such they may be called, are mere shacks. Strange to say, on farms where such buildings were, farm machinery of nearly every description could be seen standing out in the weather. Fine large herds of Herford cattle and good crops, except wheat, which was quite poor, met the eye in Western Minnesota.

Up to this time nothing looked strange or seemed to have what we might call a western appearance, but the view was decidedly changed again when we reached the great wheat fields of North Dakota. The vastness of the agricultural operations in that state cannot be imagined. I attempted to count the binders at work in a large field of wheat, but they disappeared in the distance and I could not tell the number.

The land in western Minnesota and North Dakota seems to be greatly in need of nitrogeneous fertilizer. The wheat crop last year yielded only from five to fifteen bushels per acre. Alkali is very abundant in the soil and in some places it is so strong that it is impossible to grow crops.

Traveling farther west we soon reached the limit of tillable land. Here homesickness and loneliness is brought on by the very desolate appearance of the country. It reminds one of a great muddy ocean with mountainous waves, the land being quite rolling. The vegetation, except along the rivers and streams, consists of a thin scanty growth of Buffalo grass and sage bushes. The grass affords good pasture and the great plains were dotted over with large herds of cattle and sheep.

In western North Dakota we entered a section of country so desolate and barren that nothing could live in it. For hundreds of miles no trace of civilization or life of any kind could be seen except the water tanks and section houses along the railroad. This condition of things exists far into Montana. Nothing came in sight to change the appearance of the bleak and barren table lands until we were within about one hundred miles of Havre, where we entered the basin of the upper Missouri. Along the slopes of the valley could be seen small herds of cattle and sheep.

After leaving Havre we traveled southwest on the Montana Central and left the train at a little town called Teton. We traveled southeast over the prairie on foot for 20 miles. Here a pleasant sight greeted us. The Missouri through this section of the country traverses a beautiful valley bounded on either side by the steep bluffs of the table land, and while traveling toward the river nothing can be seen of it until one gets within a few hundred yards of the cliff.

In places the valley narrows into a deep and rugged canon, but in others the river has formed large alluvial flats, which afford good pasture. If these flats were irrigated, which could be easily done, doubtless fine crops of grain could be grown. The rainfall is very scanty and comes only in the early spring.

The clear blue water of the crooked Missouri, fringed on either side with beautiful green cotton-wood and willow trees, the alluvial flats dotted over with Indian tents and herders' shacks, the great bands of sheep and herds of cattle afforded a pleasing view to a weary walker who had traveled over those parched prairies and seen nothing but sage bushes and rattlesnakes.

J. C. BRITTON.

Agriculture in the Orient.

Since the acquisition of the Philippine Islands by the United States, the question of first importance in the minds of Americans, always alert to find fields for new enterprises, has been what new opportunities for American enterprise do these eastern possessions offer. During the last year the Secretary of Agriculture the last year the Secretary of Agriculture sent an agricultural explorer to Japan, China and the Philippines, who was instructed to learn of such products of the farms, fields, and forests of those countries as might be of advantage to the agricultural industries of the United States.

In the report of Dr. Knapp, the agent, attention is called to the fact that all fears of competition from Japan along agricultural lines may be dispensed with. On the contrary it must become a large consumer of farm products drawn from the United States.

"Of fabrics, cotton and wool alone have made much progress under the factory system and this is owing to the fact that they were not produced to any extent in the empire, and hence no home system of manufacture had been established for them."

Regarding China, the report says: "The great area, the large per cent. of fertile lands and the enormous population of China, stagger the observer on the threshold of investigation. Here,

however, as in Japan, radical changes in agricultural methods and products must be made very slowly, if at all, because the food supply cannot be reduced or even changed with safety. Large areas devoted to fibre plants for the promotion of manufactures would be a dangerous invasion of the acres necessary for the food supply and must be speedily followed by importations from the United States."

From China Dr. Knapp proceeded to the Philippines. Arriving at Manila, he went by rail as far as San Fernando, passing through the rice section to the east and north of Manila, on to the sugar lands to the north. The yield per acre, according to the best authorities, is about 1000 pounds of hulled rice on lands under rainfall irrigation solely, and 2000 pounds on lands artificially irrigated. This shows very careless husbandry. The rice clay loam soil about San Fernando is well adapted to sugar cane. In Luzon the methods of sugar farming are quite different from those practiced in the United States, while the factories are the crudest conceivable.

The sugar is drained upon the open kettle plan. The proprietor furnishes land and factory and the tenant furnishes seed, does all the work in the field, delivers the cane to the mill and supplies most of the hands for making the sugar. The proprietor receives half the sugar and all the molasses. The tenant, in theory, is allowed the remainder, but in practice he usually receives about two-fifths of the sugar. Dr. Knapp was informed that in the islands of Panay, Negros and Cebu the sugar farms and factories are much more improved than in Luzon. Sugar lands produce from 3000 to 8000 pounds per acre, depending upon the cultivation and the factory.

The Filipinos, as far as he observed, do not give as much attention to the production of nitrogenous foods as the Japanese, hence are less muscular. Spanish statistical reports and interviews with Manila exporters satisfied the doctor of the prosperity of the tobacco and hemp industries under normal conditions. Millet, maize, sago and indigo do well, and are, ordinarily, profitable crops. Philippine coffee, of which there were formerly many plantations, has a peculiarly rich and pleasant flavor. Coconuts, pineapples, oranges, bananas, grapes, figs and many other fruits grow almost spontaneously.

The Philippine Islands abound in valuable wood for building, furniture, dye woods, and some yielding costly gums.

According to the best authority, nearly two-thirds of the land is still public, and passes to the United States with the title. If opened for settlement to soldiers, many of our young men will remain and become permanent settlers. Some associations of this kind have already been organized. The price of improved land ranges from \$4 to \$20 per acre (gold), depending on the location and value of the improvements.

Reports of the observatory at Manila show that the average rainfall for the past thirty years has been 75.5 inches. The temperature is quite uniform, averaging during the past 18 years 77 degrees for January, the coldest month, and 83.8 degrees for May, the warmest month. Within that period the thermometer only once rose to 100 degrees and once fell to 70.4 degrees. Prominent Filipinos informed Dr. Knapp that upon their estates the laborers were industrious and thrifty, and, if encouraged, these conditions would become general. A visit to the carpenter shops, machine shops and various small factories satis-

fied him that the Filipinos make good mechanics when properly trained.

While very careless husbandry is practiced in the Philippines, the report shows conclusively that the islands offer excellent opportunities for success to careful and efficient methods of agriculture.

Rural Mail Service.

Perry S. Heath, First Assistant Postmaster General, has just completed his annual report on the rural free delivery service of the United States. The report shows how it has grown and spread until it is now considered indispensable in the districts where tried, and the success of the service is established to the entire satisfaction of the Postoffice Department.

It will prove of interest to note the strong opposition at the time the idea was first brought to the attention of the Department. In the Fifty-third Congress it was condemned, by the chairman of the House Committee on Postoffices and Post-roads, as a scheme impossible of execution, requiring an appropriation of \$20,000 to inaugurate it. Postmaster General Bissel refused to test the scheme even after Congress had appropriated \$20,000 for experimental purposes, and in 1895 his successor, Mr. Wilson, with the same appropriation, took no action.

In 1896, \$40,000 was made available and Mr. Wilson reluctantly put the service to the test. Forty-four routes were established in different parts of the country, and from the beginning the experiment proved successful.

At first the cost of delivery of every letter averaged from $2\frac{1}{2}$ to $6\frac{1}{2}$ cts., but another appropriation of \$50,000 was made in 1897 and such good results were obtained that Congress appropriated \$120,000 for the fiscal year 1897-98 and \$300,000 for the same purpose in 1899.

On November 1, 1899, rural free delivery was in successful operation over 383 routes, in forty States and one Territory. There were seventeen in Illinois, forty-four in Indiana, fifteen in Michigan, fifteen in Wisconsin, forty-nine in Ohio, and twenty-four in New York, these being among the most favored States. Idaho, Mississippi, Montana and Wyoming were the only States unrepresented. Two hundred and forty-three routes have been established since the first day of July of this year, extending the free delivery to nearly 180,000 persons at an annual cost of 84 cents per capita.

The service has been practically self-supporting, when the saving in the cost of fourth-class offices and star routes, which were superseded by the new service, is considered, and the postal receipts have averaged an increase of from 50 to 75 per cent. in the districts served.

The cost of free delivery service in the smaller cities is about \$2.80 per capita. From this it will be seen that the comparison with rural free delivery is very disproportionate. In the smaller cities the additional accommodation was slight, while in the country it is very great; saving hours of valuable time and the cost of the wear and tear on beast and vehicle. A Missouri farmer calculates that he has traveled 25,000 miles to and from the postoffice within the last fifteen years, all of which travel is now saved him by the rural delivery.

Within the districts of delivery the only opposition has been upon the part of fourth-class postmasters, because it was the means of closing their offices. When this is done, all other things being equal, preference is given in the appointment of carriers to the former postmasters.

Under present regulations rural free delivery carriers give receipts for money orders, and it is the intention of the au-

thorities to shortly empower them to receive and receipt for registered letters and packages.

One of the most noticeable results of the service has been the improvement of the condition of the roads throughout the country wherever the service has been inaugurated. The scheme has been heartily endorsed by the good roads' clubs throughout the country.

We have always advocated the theory that good roads should be made one of the qualifications for the establishment of a rural free delivery route, but if this order should be reversed, and good roads result from rural delivery we shall be satisfied for good roads are of more importance than rural delivery. The fact remains, however, that these two steps toward the emancipation of the farmer from his social isolation, the improvement of roads and rural mail delivery, go hand in hand.

Book Reviews.

"Forage Crops Other Than Grasses"; how to cultivate, harvest and use them. By Thos. Shaw, Professor of Animal Industry at University of Minnesota. Illustrated, pp. 300, cloth. Orange Judd Company, New York. Price, Postpaid, \$1.

Under the term, "Forage Crops," as used by the author, are comprised all pasture plants which are sown from year to year—and which are fed off by the animals in the field. How easily and satisfactory forage plants can be made to supplement perennial pastures, how profitably they can be raised on land which otherwise would be idle, and how important a place they are destined to occupy in the near future in systematic crop rotation on every stock and dairy farm, has been the author's aim in writing this book.

The initial chapter is devoted to forage crops in general, while the succeeding ones treat on the special kinds of crops:

Indian corn, sorghums, clovers, leguminous plants other than clover, plants of the Brassica genus, the common cereals, millets, field roots, etc. In discussing the various plants the author dwells upon their distribution, the soils to which they are adapted, the rotation in which they should be grown, the preparation of the land, the time for sowing them and the methods of doing the same, the modes of cultivation and of pasturing them when grown.

The work has a practical ring about it, from beginning to end, that begets confidence in the reader as to the value of its contents. By confining himself strictly to his subject, and in not attempting to cover too much ground, the author has been enabled to make every point so clear and plain that anyone who knows nothing of any of these crops would understand how to grow and use the same after reading the book.

By special arrangement with the publishers we can furnish our readers with a copy of this valuable book for 70 cents, postpaid, cash to accompany each order.

"Evolution by Atrophy," by Jean Demoor, Jean Massart and Emile Vandervelde. Cloth; pp. 332. D. Appleton & Co., New York. Price, \$1.50.

This is volume 79 of the international scientific series, and the authors are Professors in the University of Brussels. The object of the work is to show that an essential element of the process of evolution, as it goes on among plants and animals, is the degeneration, decay or atrophy of organs or parts of organs, while at the same time other parts or organs may, and generally are, being carried to a higher stage of development.

On the other hand, they point out that what is true in biology is true in sociology, that society is constantly changing to adapt itself to surrounding conditions. The authors point out that in this social evolution the phenomena of

degeneration, or atrophy, plays as important a part as in the animal or plant kingdom. Some of the examples that are cited seem rather "far-fetched," but on the whole it is a valuable edition and opens up a comparatively new field for investigation.

"Animal and Plant Lore," by Fanny D. Bergen, with introduction by J. Y. Bergen. Cloth; pp. 178. Houghton, Mifflin & Co., Boston and New York. Price, \$3.50.

This is volume VII of the memoirs of the American Folk Lore Society. The book has been divided into two parts, Animal Lore and Plant Lore, and under these two parts are given 1,397 sayings and traditions and the locality in which they are common. The work is furnished with copious notes and is a vast storehouse of the old traditions and signs that have been handed down from generation to generation.

A Study in Judging Sheep.

One feature of the Agricultural course at the Ohio State University is a study of all the improved breeds of live stock. This includes a detailed study of individuals in comparison with the ideal types as outlined by the various registry associations. Score cards are employed in this work and the student after a preliminary lecture and demonstration of method of examining the different classes is required to make critical examination of animals with score card in hand and mark proper deductions from the standard for deficiencies that he discovers.

For this work on sheep representative animals (usually a ram and two ewes) of each breed available are secured for a week from some prominent breeders of the state. Twice Greene County breeders have generously furnished sheep. No other county in the state has as many different breeds represented by show flocks of a high standard of excell-

ence. The county has not as yet, however, shown flocks of dorsets and ram-bouillots.

R. D. Williamson furnished American and delaine merinos. The former of exceptional merit in point of fleece. Both ram and ewe were almost free of body folds yet showed all the density of fleece that can be found in connection with a satisfactory length of staple. These animals also showed the very highest development in the evenness of the fleece. The ewe was faultless in this particular. The delaine ram lamb was also exceptionally strong in this feature of the fleece.

R. C. Watt furnished southdowns of distinct merit, having beautiful form and features.

D. H. Cherry supplied the Hampshires. The ewes of this flock were of almost faultless form. The ewe lamb being a very high scoring animal.

The Oxfords furnished by J. C. Williamson were two of his imported animals and an almost ideal home bred ewe. These animals were of exceptionally fine features and good form, yet plenty of size. The three-year-old ram weighed 300 pounds and ewe 245 pounds, being the heaviest animals of their respective sexes in the flock.

The Costwolds furnished by D. B. Watt & Son were an imported ram of magnificent carriage and plenty of size, weighing 284 pounds in breeding condition and only two years old, a two-year-old ewe of almost faultless type and a ewe lamb of their own breeding that was the highest scoring animal in the flock.

The Lincolns were a very typical ewe in form, features and fleece, and a Canadian bred ewe of remarkably dense fleece, good proportions and firm handling quality. These were furnished by J. R. Bickett. Mr. Watt, of the firm of D. B. Watt & Son, accompanied the sheep and acted as showman, while Mr. H. P. Miller, of Sunbury, attended to the scoring. These sheep were furnished through the courtesy of the several breeders and the special efforts of D. B. Watt & Son.

